

EXPLORATION OF A PIT HOUSE VILLAGE AT LUNA, NEW MEXICO.

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While excavating a small stone house ruin at Stevens Cienaga, near Luna, New Mexico, in 1905, a circular pit was laid bare beneath the plaza. It was apparent that the pit had been filled with débris by the occupants of the stone houses and smoothed over to form a level dance place. This find led to the search for other evidence of pit structures. Several sites were discovered and were noted in Bulletin 35, Bureau of American Ethnology (pp. 59-64). All these sites except one were associated with stone houses; that one, a site at Luna, New Mexico, which appeared to be a village of pit dwellings pure and simple.¹ This site was discovered through the curious circumstance that the weeds grew higher in circular areas over a large tract of land, evidently due to greater moisture and fertility of certain spots, apparently buried pits. Although discovered in 1905 no work was done here till June, 1916, when a small grant from the Bureau of American Ethnology permitted a preliminary examination.

Permission to carry on archeological work on the Gila Forest Reserve was kindly granted the Smithsonian Institution by the United States Department of Agriculture. The land embracing the ruins has been filed upon by James Melvin Swap, of Luna, who generously approved of the work of excavation.

Topography.—The ruin occupies a gentle slope inclining south by east on the third terrace above the San Francisco River, which is about $1\frac{1}{2}$ miles away. The terrace abuts on low hillocks to the north. The area, about 30 acres in extent (see map), has been naturally forested since the abandonment of its use for human habitations, but a majority of the trees (pines) have matured and died or have been logged off. The soil is loose but is not washed, the only run-off being to the east and west of the tract. The eastern drain is a rivulet carrying permanent water from springs in high ground a few miles to the north. The field is smooth and is covered with dark loam about 1 foot thick. Below this is a yellow-brown clayey

¹ Another site 7 miles north of Luna was discovered in 1917.

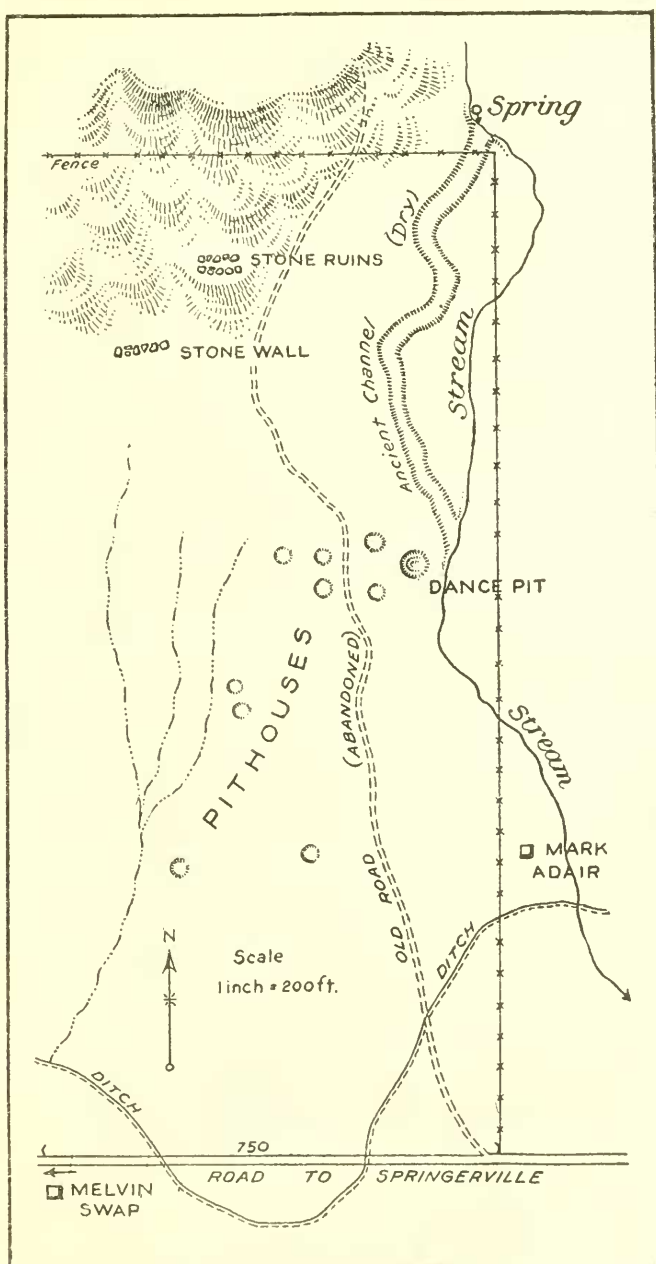
stratum somewhat sandy in places and about 5 or 6 feet thick. Below this the clay becomes gravelly. There are no rocks in the soil, which may be classed as lake shore alluvium covered with products of organic action on soil resulting in loam. In this soil there had been anciently dug perhaps 100 or more pits 14 feet in diameter and $5\frac{1}{2}$ feet deep. Covering them were roofs of poles, boughs, and mud supported on posts, and the sides were perhaps wattled. It is evident that at a former time human activities had disturbed the contour of a large area by the removing and piling up of great quantities of earth. On the abandonment of this village, however, began the leveling forces of forest growth, wind, frost, and rain acting in concert to restore the surface to the smoothness which it presented when seen in 1907. At this time all traces of the pit-dwellings were obliterated, and they were only revealed, as mentioned, by the distribution of vegetation which grew higher in circular areas over the tract. The completeness of the work of the natural agencies is a matter for wonder. (See plate 28.)

During the 11 years passed since the site was observed, the field, lying without fence, had been so trampled by cattle and dug up by prairie dogs that no signs of the pits were visible. Doubts even arose as to the validity of the former conclusions. Fortunately, however, the first excavations uncovered the side of a pit filled with soft earth.

Pit No. 1.—A trench was begun in made soil and prolonged until undisturbed earth was encountered, and this was followed around on the circumference of a circle 14 feet 7 inches in diameter. (Pl. 29.) The earth within this circle was then carefully removed and all artifacts, bones of animals, etc., sorted out during the process. Information on the construction of the pit house soon was supplied by charred remains of posts and burnt clay bearing impressions of roof structure. The soil filling the pits is dark and rich, and contains charcoal, ashes, bones of animals, hand stones, whetstones, cores, bruising hammers, flakes, fragments of pottery, etc.

A large grooved hammer was found. An irregular metate was observed at the 4-foot-6-inch level, and this stone was probably raised a foot from the floor. (Pl. 30.) The metate was rude and not deeply worn. Near the metate was encountered a smooth stone slab with rounded corners and edges, probably a bread-mixing slab. A small mortar, consisting of a cavity in an irregular stone, was taken out. Two feet from the center of the pit and near the metate was a bed of ashes, indicating the fireplace. A burial of an infant was found in the west wall, accompanied with a roundel ground from a piece of pottery and a fragment of a pottery vessel. Also on the west side, at a depth of 3 feet, there occurred a vase with broad handle containing white potter's clay. (Fig. 32.) There was a large recess on

the west wall packed with débris. On the east side of the pit there was uncovered a bench 18 inches high and approximately 36 inches



MAP OF REGION STUDIED.

wide cut in the soil. In the center of the pit was a hole 20 inches deep, probably for the center post. The floor of the pit was yellow

natural earth with thin layers of packed black earth, indicating the floor level.

Pit No. 2.—Twenty-five feet southeast of pit No. 1 there was opened a pit 63 inches deep and 12 feet in diameter. On the west side was observed an earth bench 6 inches in height, and at the floor level near the southeast wall a hole 27 inches deep and 12 inches in diameter. (Fig. 1.) On the floor near the center of the pit lay a meal-ing stone and adjoining it a fireplace. Remains of posts (pl. 31), some fragments of baked roofing mud, hand stones, and animal bones were found in this pit.

Meal-ing house.—Southwest of pit No. 2 was unearthed a meal-ing house, 12 feet square, as indicated by charred remains of corner posts. This shed, like the pit houses, had been roofed with mud. It con-

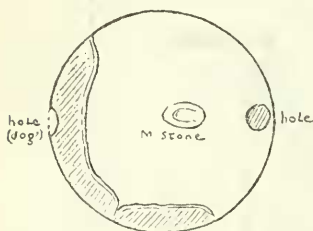


FIG. 1.—GROUND PLAN OF PIT.

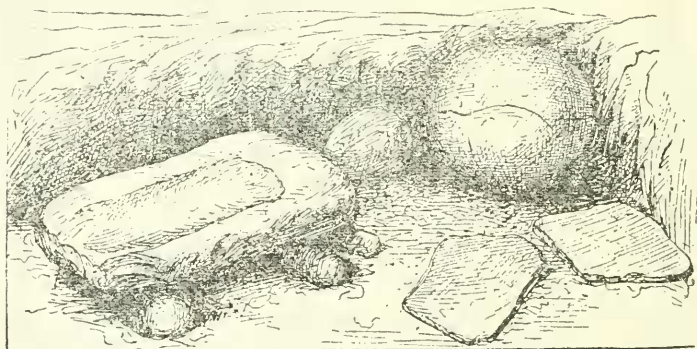


FIG. 2.—OBJECTS IN PLACE IN MEAL-ING HOUSE. (FROM A SKETCH BY THE AUTHOR.)

tained 6 to 8 metates, one of them mounted on three rounded stones (fig. 2), and many hand stones, rubbing stones, slabs, etc. Fragments of nine large coarse pottery jars and several bowls were interspersed among the stone implements. There were here several burnt clay hearths and much charcoal mixed with the soil. (Fig. 3.) All the specimens were found in the layer of surface loam somewhat more than a foot under the ground. The loam which is about a foot deep becomes very hard when dry and breaks into cubes during drought. The structure unearthed here was an open-air shed, mud covered, in which grinding and cooking was done as in the similar sheds of the Pima-Papago. (Fig. 4.)

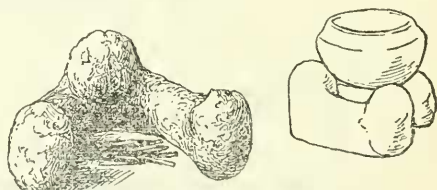


FIG. 3.—CLAY HEARTH AND METHOD OF USE.

Cemetery of infants.—Southeast of and near pit No. 1 was a cemetery in which infants alone were buried. There were hearths of burnt clay in this cemetery like those in the ruin at Stevens Cienaga.¹ Four or five burials were encountered, and these were accompanied with pottery of small size but interesting in form and decoration. With the body of a child of about 5 years had been placed a flint scraper and some bones of deer. On the border of the cemetery there were taken out, at a depth of about 5 feet, hearthstones with charcoal lying upon them and mealing stones. Many large bones of animals cracked to obtain the marrow were found in the débris. Some of the bones are burnt.

Pit No. 3.—A section of this pit was opened and the wall was seen

to be well defined. On the floor lay a metate and a wedge-shape stone of equal dimensions, probably a rest for inclining the metate. Here were a number of hammer stones, pottery fragments, bones, etc.

Pit No. 4.—This pit was completely opened out. (Pl. 32.) It is 12 feet in diameter. As noted in other pits, there was a deep hole sunk in the floor on the west. There was a metate in place, and in the course of the excavation mealing stones, whetstones, and fragments of decorated pottery were removed.

Mealing house No. 2.—Adjoining pit No. 4 a cooking or mealing house was excavated. It yielded a globose vessel of thin gray pottery tolerably



FIG. 5.—FIREPLACE WITH CLAY JAMBS.

well decorated and furnished with pierced lugs (see fig. 38) and many fragments of large coarse, black pottery vessels. There were found many stones and hammers and animal bones. Some pieces of infants' skulls were seen, but not as formal burials.

Pit No. 5.—Eight feet northwest of pits Nos. 1 and 2 a pit 42 inches deep was opened. From the evidence of the action of fire this pit was called the fire pit. A great fireplace was set against the west wall and flanked on either side with a rounded jamb of burnt clay. (Fig. 5.) The west wall was deeply burnt between the jambs, and on the hearth, which was level with the floor, lay much ashes,

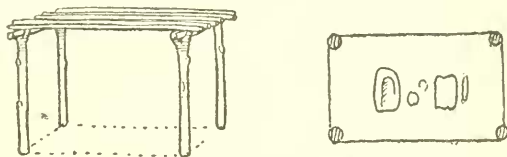


FIG. 4.—PLAN AND ELEVATION OF MEALING HOUSE.

¹ Bulletin 35, Bureau of American Ethnology, 1907, p. 63.

charcoal, and remains of charred posts. (Fig. 6.) Adjoining was a smaller fireplace having a smooth hearth and a bottom slab in form of a tablet with rounded corners and edge, probably a baking slab. (Pl. 33.) Beyond the smaller fireplace lay a great mass of burnt roof clay, rendering it evident, in connection with the charred beams, that the pit structure was destroyed by fire. On the floor of this pit lay two metates, a grooved maul, and other stone implements, as well as fragments of pottery.

Pit No. 6.—Sixty-six feet north of pit No. 2 a pit was cleared.

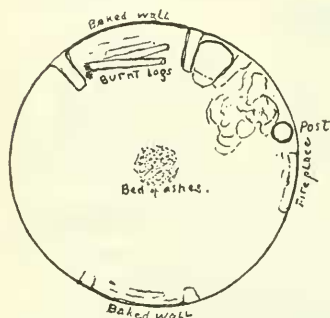


FIG. 6.—GROUND PLAN OF FIRE PIT.

In it were found a number of regularly worked and irregular metates, and near them hand stones, stone hammers, and fragments of rough pottery. The hearth in this pit was formed of many stones of equal size laid as pavement on the floor of the house, and upon the hearth was a layer of gray wood ashes.

Pit No. 7.—This pit contained the customary metates, hand stones, etc.

At the floor level on the east side is a hole 3 feet deep. A cache of bright yellow paint was discovered under the earth-bench, and a small lot of obsidian nodules was found hidden in a hole in the wall. There were many animal bones, fragments of pottery, and chips of hard stone. A mass of chips fallen from the stone-workers' hands were found in a little heap. A pottery spindle-whorl and two bone awls were taken out. The pit was 4 feet deep and 14 feet in diameter.

Great dance pit.—Southeast of pit No. 2, 108 feet, is a circular concavity 84 feet in diameter and 5 feet deep. (Pl. 34.) It adjoins

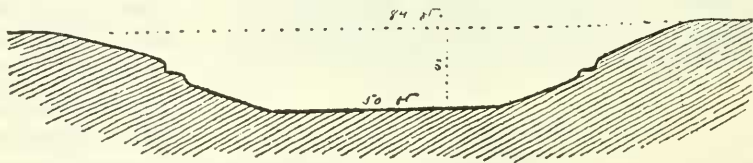


FIG. 7.—SECTION OF GREAT DANCE PIT.

the bank of a former channel of the small permanent watercourse east of the village site. The margin of the pit fades off into the general land level, but is eroded slightly on the north and east. A pine tree 9 feet in circumference stands on the south rim, and remains of dead trees cover the northeast section of the rim. The earth in the pit is hard-packed loam containing fragments of charcoal. In exploring this pit a trench was cut from the center to the circumference on an east-and-west line, following the bottom contour as shown by the unmodified earth. (Fig. 7.) Beginning at the edge

there is a slope of 25 feet to a set-off 16 inches high, apparently the back of a bench 4 feet wide. The depth here is 31 inches from the surface of the deposit in the pit. From this bench the ground slopes about 12 to 16 feet and merges into the level floor of the pit. The deposit here is 50 inches deep. There was thus a circular floor for dance purposes, about 50 feet in diameter, with 196 feet of bench around it for spectators. This amphitheater pit, approximately 265 feet in circumference and nearly 10 feet deep, was probably surrounded with a palisade. It will be seen that the earth deposit in the pit (50 inches) is about that which levels the pit houses, but the great pit being 10 feet deep is not filled, and hence it is the only surviving landmark of the ancient village. The labor of excavating the great dance pit or kiva was great, and the work seems to show that the population of Pit Village was large enough to furnish a good force of willing hands. As no tools of stone for digging were

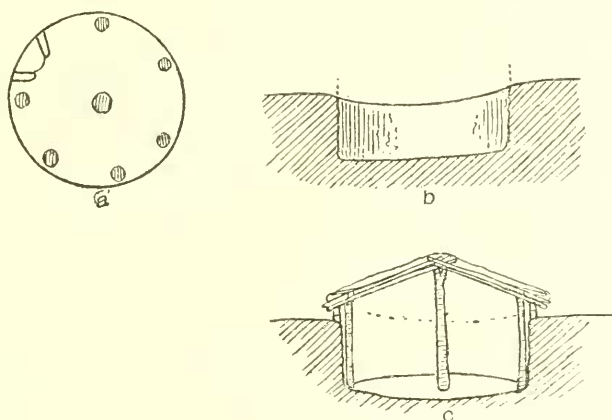


FIG. 8.—PLAN AND SECTIONS SHOWING CONSTRUCTION OF PIT HOUSES.

found, it appears probable that the excavation was made with digging sticks and the earth removed in skin bundles.

Enough has been learned through the tentative exploration to enable us to essay a restoration of the pit village as it may have appeared centuries ago. The data shows that the excavation and the added height given by the removed earth would be about 8 feet, leaving thus 3 feet of the house above ground. The roof would be supported on eight posts about 10 feet long. The sides of the house above ground would be wattle and daub, or wattled and banked with earth. (Fig. 8, *a*, *b*, *c*.) Judging by the height of the earth embankment thrown up in the excavation of the pits during the present work, the measurements suggested, as well as the banking, seem plausible. It would be easy thus for the Indian to walk up on his roof and descend through a hatchway by means of a notched ladder as used by the Pueblos. The appearance of the cluster of

houses forming the village would be that of circular mounds interspersed with rectangular open-air sheds and on the margin of the village a pallisaded dance circle. (Pl. 35.)

ARTIFACTS.

Mealing stone.—Turtle-shape stone of coarse volcanic grit for use as a mano. The working face of the stone is flat from side to side and ground to the arc of a circle about 12 inches in diameter from end to end, showing that it was used in a basin-like metate like those found at Luna. It belongs to the pillow type of mano found south of the mountains and in California. North of the mountains the mano is usually worn to a triangular section from use on a flat, steeply inclined metate, as among the existing Pueblos. Quite frequently the pillow-shaped mano is grooved along the sides for the finger grip. (Fig. 9, No. 292113, U.S.N.M.); $4\frac{3}{4}$ inches wide, $6\frac{3}{4}$ inches long, $1\frac{1}{2}$ inches thick.

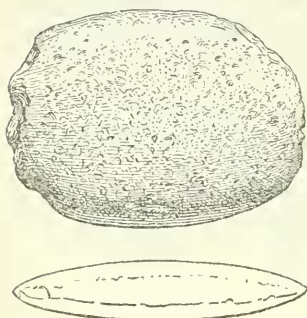


FIG. 9.—MEALING STONE AND SECTION.

Metates.—As remarked, every pit house revealed on excavation a mealing stone lying on the floor near the fire and in the open-air sheds a number were taken out. Sometimes an irregular stone had been used with almost no shaping (fig. 10); again the stone was roughly pecked to shape (figs. 11, 12); a little more work was put on some specimens (figs. 13, 14); but in no case were the metates finished to a definite form as among the Pueblos. Two specimens display a specially worn area near one end like specimens from northern Arizona and Utah. (Figs. 15, 16.) Metates in the pit houses were propped up at the required slant on a wedge-shape stone which had been selected for its shape. (Figs. 17, 18.) In the sheds they were sometimes set up on three stones. (See fig. 2.) The metates found are of gray grit stone and were nearly all broken in place or cracked to pieces on removal into the air.

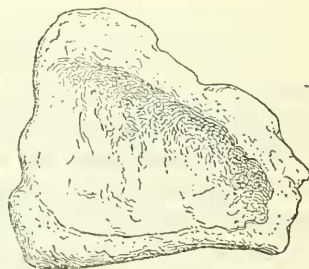


FIG. 10.—IRREGULAR MEALING STONE.

Paint grinding (?) stone.—Small oval slab of fine grit stone, flat below and concave above, the concavity smoothly worn. Suggests the stones used by the Zuñi and other Pueblos for grinding paint, numbers of which are exhibited in the halls of archeology. The use to which this specimen was put is not known. Only this one was

found (fig. 19, No. 292087, U.S.N.M.) ; $2\frac{3}{4}$ inches wide, $3\frac{1}{2}$ inches long, $\frac{3}{4}$ inch thick.

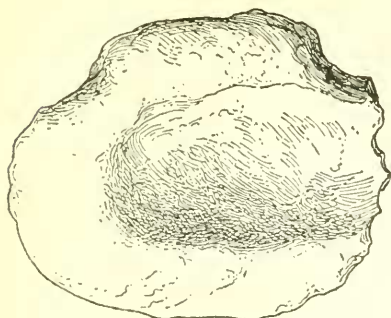


FIG. 11.—MEALING STONE PARTLY PECKED.

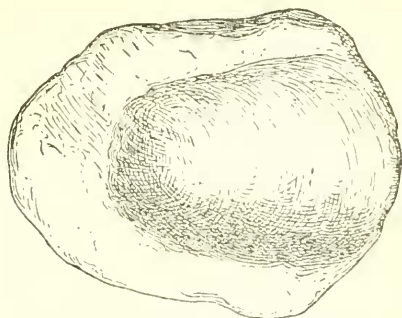


FIG. 12.—MEALING STONE PARTLY PECKED.

Mortars.—The mortars from this site consist of large, rough slabs of stone having a small cavity worked in the flat side. The cavities

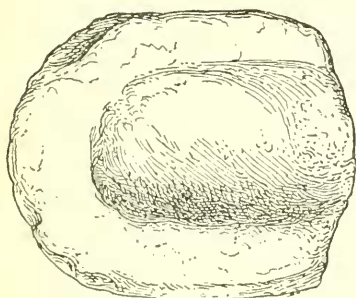
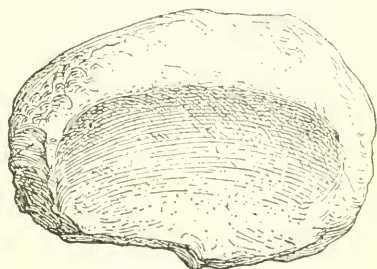


FIG. 13.—MEALING STONE WORKED TO SHAPE.

FIG. 14. MEALING STONE WORKED TO SHAPE.¹

are smooth and regular. (Figs. 20, 21.) No pestles were found in the site, but the specimen found on a neighboring field may be taken

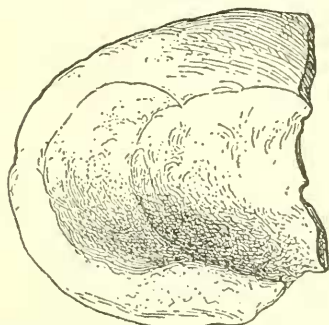


FIG. 15.—MEALING STONE WITH POCKET CAVITY.

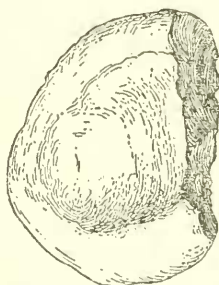


FIG. 16.—MEALING STONE WITH POCKET CAVITY.

as the type. (Fig. 22.) It has been suggested that the small mortars were used for bruising roots and extracting the fiber from yucca and agave leaves.¹

¹ Bulletin 87, U. S. National Museum, p. 15.

Pestle.—Of gray green sonorous stone, scarcely showing at this interval traces of the methods by which it was fashioned or of its wear through use. The specimen was ploughed up in a field in the village of Luna by Mr. Adair. No pestles have been found in the

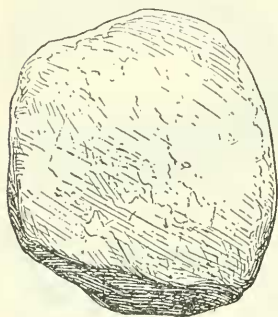


FIG. 17.—WEDGE SHAPE STONE FOR PROPPING METATE AND SECTION.

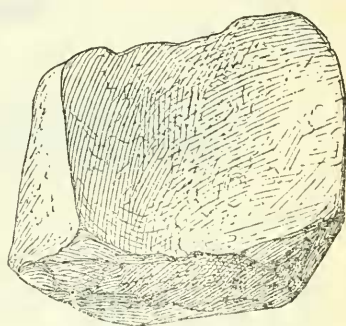
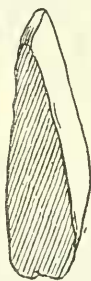


FIG. 18.—WEDGE OF STONE FOR PROPPING METATE.

pit village, but small mortar stones were taken from the pit houses (fig. 22, No. 300094, U.S.N.M.); 2 inches diameter, $14\frac{1}{4}$ inches long.

Stone slab.—Smooth slab of blackened stone worked on the edge. In getting out the slab or in securing a proper size piece the worker

scored a channel deep enough to admit of breaking the stone off without flawing. The edges were then ground smooth and the corners rounded, precisely as the Zuñi quarry and finish their baking slabs. The specimen formed the bottom of the smaller fireplace in the fire pit (fig. 23). (See

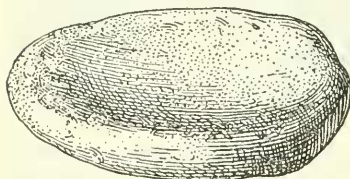


FIG. 19.—STONE FOR GRINDING PAINT

fig. 5.) Other slabs were found in the mealings sheds (figs. 24, 25, No. 292120, U.S.N.M.); 14 by 15 inches, 5 inches thick.

Stone hammer.—Coarse basaltic rock, the surface roughened and pitted from age. A deep groove has been pecked around the stone,

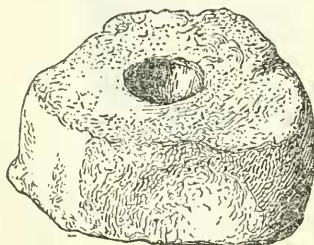


FIG. 20.—SMALL MORTAR IN STONE BLOCK.

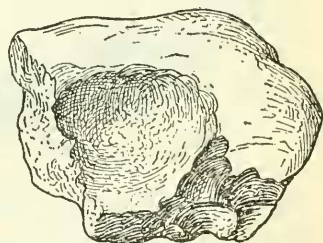


FIG. 21.—BROKEN MORTAR.

except where the hafting touched, dividing it into two equal lobes. One face of the hammer is squarish, the other spalled by working. A few of these hammers were observed, the common type being nodu-

lar of chalcedony or other hard stone (fig. 26, No. 300093, U.S.N.M.); 6 inches long, $3\frac{1}{2}$ inches diameter.

Hammer stones.—Water-worn quartz pebble showing several bruised areas, due to work in hammering. This specimen is a good example of the selection of a naturally formed stone for a particular use (292099); $2\frac{1}{4}$ inches in diameter.

Another of brown grit stone bears evidence of use as a

hammer and rubbing stone (292099); $3\frac{1}{2}$ by 3 by 2 inches. The utility hammer, however, of this site begins as a block of chalcedony, often having one face showing the curve of the parent formation. This block from use becomes rounded and smaller until when compara-



FIG. 22.—PESTLE OF GREEN STONE.

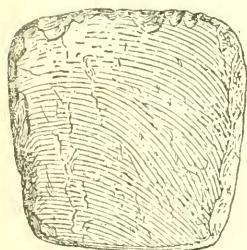


FIG. 23.—SMOOTH STONE SLAB FORMING A HEARTH.

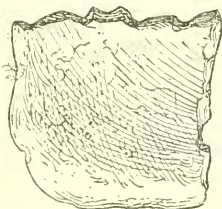


FIG. 24.—FRAGMENT OF SMOOTH STONE SLAB.

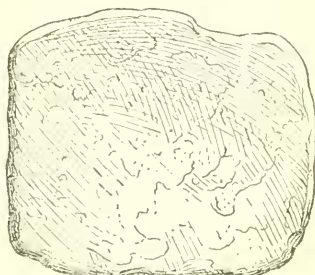


FIG. 25.—STONE SLAB FROM MEALING SHED.

tively smooth is discarded or employed in minor work, as in the case of a pebble just picked up for the occasion. In this way numerous hammers gather about a long-inhabited site and superficially give an indication of numerous workers. Observations among the Hopi prove

that a hammer stone is useful for working stone only while its facets are sharp. The hammer is then given a chisel effect rather than a bruising effect (292098, U.S.N.M.); $2\frac{1}{2}$ inches in diameter.

Abrading stones.—Irregular pieces of brown grit stone showing use of abrading were relatively frequent in the pit-

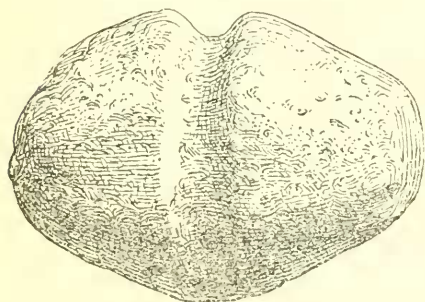


FIG. 26.—GROOVED STONE HAMMER.

house debris. Some of them have flat working surfaces, but many of them have been reduced by use to nondescript shapes, as though by employment in shaping wood. Grit stone is scarce in this region, and pieces of it were no doubt prized by the pit

house people. They did not have the grooved arrow-shaping tools so common on other sites throughout the Southwest. (292118, U.S.N.M.)

Lava rasp.—Several pieces of worked vesicular black lava found give evidence of their use as a rasp, probably for currying hides in the process of tanning. One piece, nearly square, is of convenient size for holding in the hand; another is ovate and has a small cavity on either side for a finger grip (292021, 292115, U.S.N.M.); 4 inches square, 2 inches thick, 4 by 3 inches square, $2\frac{3}{4}$ inches thick.

Pot rest or andiron.—A number of stones, conical in shape, apparently not worked but selected for the practical utility of their form, were seen in the débris of the open-air sheds. In one instance they acted as supports for the metate, but mostly they were associated with fireplaces and evidently employed as primitive andirons. They answer for the formed clay bosses on the triangular hearths discovered in several places in this region (fig. 27, No. 292104, U.S.N.M.); 4 inches in diameter, $3\frac{3}{4}$ inches high.

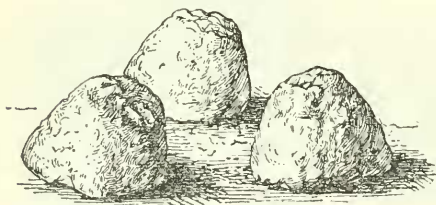


FIG. 27.—PRIMITIVE ANDIRONS.

Minor stonework.—The scarcity of stones of all character on the pit-village site is noteworthy. Such small worked objects and refuse as

occur are select material brought in from the surrounding region. Most plentiful are masses and chips of banded chalcedony, which occur in rosette and bulb forms generally here. It was used for hammers, cutting chips, etc., but could not be worked into arrowheads. A variety of chalcedony almost ruby color worked better and was evidently prized. Obsidian nodules were collected from some source and brought to the site for use as cutting chips and arrowheads. Three of such nodules were found cached in the wall of a pit. Small obsidian nodules about the size of a pea and nearly uniform are somewhat frequent and may have been used in rattles. Occasionally a small quartz crystal is found. Other chippeable stones are a greenish basalt and a black homogeneous stone resembling chert. The paucity of materials is striking.

Arrowheads.—These are small and the majority of black obsidian. Some of them are well made, but most are rude. A few were of milky chalcedony.

Scraper or knife.—Not often do the chips show evidence of use or rechipping. A small tablet of chalcedony has a chipped edge and may have been used in cutting or scraping. One milky chalcedony

specimen has the ovate scraper form, which may or may not be intentional.

Pendant.—Thin tablet of light-brown, fine-grain stone, smooth on one side and covered with vertical grooving on the other. Two holes are drilled near the edge for suspension. This is one of the two examples of the working of stone for ornament from this locality. (Fig. 28, No. 292069, U.S.N.M.) Found in the débris of a pit; $1\frac{5}{8}$ inches long, $1\frac{1}{2}$ inches wide, $\frac{3}{16}$ inch thick.

Fetish.—Of limestone carved in the form of a bear. Through the body is drilled a hole for the suspension of the fetish by means of a string. The specimen exhibits a marked appreciation of form on the part of the maker and considerable skill in carving. The work was done with Stone Age tools, marks of whose action are still apparent. The specimen represent a higher stage of art than was anticipated from the crude character of other artifacts gathered here. Found on the surface. (Fig. 29, No. 292092, U.S.N.M.)

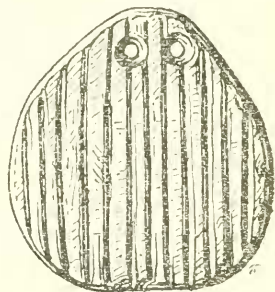


FIG. 28.—CARVED STONE PENDANT.

Pigment minerals.—Most prevalent of paint stones at Luna were stream boulders of dense white limestone. These show surfaces which have been planed away by grinding on another stone to produce white paint for body decoration or other purposes not connected with pottery, in which case white clay was used. (292116, U.S.N.M.)

Red ochre paint was not observed on the site, but a brilliant deep yellow ochre was somewhat frequently found. A mass of this color was stored in a small pot, and several masses were found under an earth bench in a pit apparently secreted there. Copper pigment, common among southwestern tribes ancient and modern, was not seen and its absence is worthy of notice.

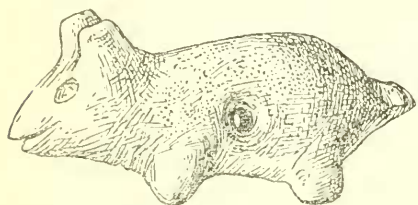


FIG. 29.—FETISH CARVED FROM LIMESTONE.

Shell.—Three fragments of a shell bracelet and one tubular shell bead were found after a thorough search. They were in the surface débris and hence may have been derived from some other source. (300082, 300083, 292070, U.S.N.M.)

Bone.—Prongs of deer antlers, one quite smooth at the point, and tips of antlers were observed. They were generally broken off and in one case cut off with a rough-edged stone. (300089, 300088, 292095, U.S.N.M.)

Two sections of ribs which show use probably as knives were found; also the unworked spinous rib of an animal (300090, 292095,

U.S.N.M.) About a dozen awls were taken from the débris in various pit dwellings. They are mostly of the fibula of the deer. In one specimen the head of the bone has been worked down and grooved around the shaft. Some of the awls had been burnt. The points are usually short and the implements sometimes worn down to a short stub (300087, 292071, 292072, U.S.N.M.); $2\frac{1}{2}$ to 5 inches long.

Pottery.—The prevailing pottery represented by fragments in the soil over the pit villages is coarse, brown, fragile ware, with unpolished surface. This was the characteristic common ware made from the local clay underlying the site. In the débris occur fragments of the same ware polished and better finished. Decorated ware, of which fragments are very few relative to the brown, has a dark gray to white paste of rather good quality, washed with white and with brown to black decoration. This clay was brought from some distance. A mass of it was found in a wide-handled vase placed in the side of a pit. Another variety of coarse, brown paste washed with white and decorated with red brown, is represented by two fragments, and only one fragment of red ware was seen. All-coiled ware does not occur, and coiling is only seen as a decoration on the necks of vessels. (See fig. 31.) Fillet rims so prevalent on the Blue and in other southern locations is not found. Incised decoration is present only on one specimen. (See fig. 39.)

Forms.—The bowl is the commonest form and is generally from small to medium size (figs. 35, 36, 37); small vases (figs. 39, 41); large vases of a rude form (fig. 30) and more furnished like those of Blue River with coiling pattern around the neck (fig. 33); vases with handles either a loop for the finger or a projection for lifting (figs. 33, 34); bird-form vases (figs. 42, 43); and globular vases with painted decoration and with bosses (figs. 38, 41).

Pottery firing.—Fragments of pottery which had been overfired, even melted, came to light in the exploration. The result of overfiring with the clays used here was to thicken the walls of the vessel by production of vesicles in the paste. This would indicate that the pottery was baked in a fire that could not be regulated, as with large wood or with material whose heating capacity could not be gauged, as with masses of rabbit brush, which burns quickly, producing great heat.

Decoration.—In all cases the decoration has been applied with an unskilled hand, and there is lacking the clear-cut line that the ancient Pueblo potter was accustomed to produce. The prevalent decoration was in bands of parallel lines or straight lines. Angled zigzag lines and serrations are frequent. In a few cases whorls are noticed, and very rarely the interlocking fret. Several fragments were found which gave a tantalizing glimpse at realistic drawing. One of these shows the head, right arm, and left hand of a

man, the drawing occupying an area in the hollow of a bowl decorated around the border with bands curved with diagonal zigzag lines, probably snakes. Another shows the body of a deer, another mountain sheep, and still another numerous stars represented by crosses. (Pl. 36.) The style of work resembles that of a bowl found at Linden, Arizona, in the White Mountains.¹

Figurines.—Burnt-clay figurines of animals are quite characteristic of the ruins in this particular region. They are found scattered through the village debris, and they have not been discovered in a definite plan of deposit, so that their meaning or use could be determined.² The pit village site yielded one of these objects found on the surface, where it may have been derived from some other ruin. An animal figurine carved from white limestone was also found on the site and appears to be a relic of the pit-dweller people. It is a realistic carving representing a bear remarkably well executed. A

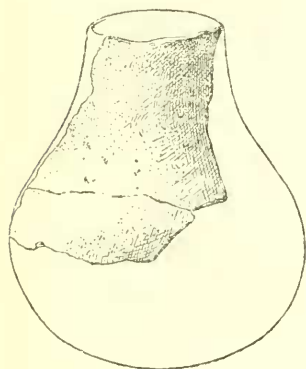


FIG. 30.—LARGE BROWN WATER VASE.

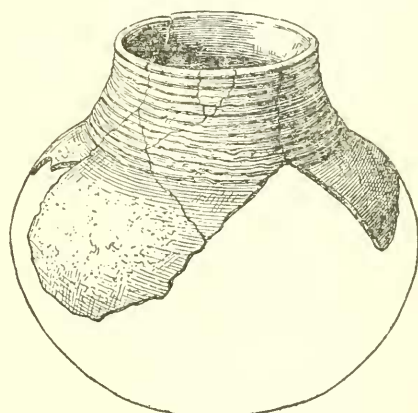


FIG. 31.—VASE WITH COILED NECK.

hole is drilled through the figurine for the passage of a cord and the object is a fetish. It may be regarded as the highest example of pit-dweller art, if in reality it belongs to this group. (See fig. 29.)

Pottery polishing stones.—Three pottery polishing stones were found on the site. One is black (a very hard stone taking a high polish) and one a quartz pebble with mirror polish on one face. Evidence from the pottery shows that the surface finish was not carefully executed. (292095, U.S.N.M.)

Fragment of large water vase.—Light-brown ware, irregular surface, not smoothed carefully, and showing no polish. The paste is characteristic of the local clay. The form of the vessel is rude and is reminiscent of a potter not an adept, resembling the sporadic Apache or Navaho clay vessels. Restored from fragments found

¹ First Museum—Gates Expedition. Ann. Rep. U. S. Nat. Mus., 1901, pl. 19.

² Hough, Bulletin 87, United States National Museum, p. 116.

in a mealing shed (fig. 30, No. 292065, U.S.N.M.); 13 inches in diameter, 16 inches high.

Large water vase.—Globular body, smooth, dark brown to black. Neck portion coiled. In most respects this vessel is like those of the Blue and of the neighboring sites about Luna. Restored from fragments found in a mealing house (fig. 31, No. 292066, U.S.N.M.); 16 inches in diameter and 16 inches high.

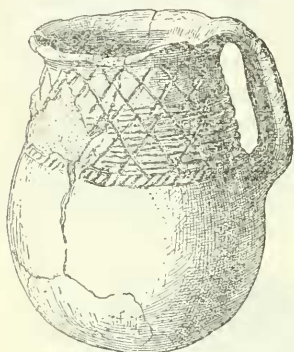


FIG. 32.—CRUDE HANDLED JAR.



FIG. 33.—SMALL HANDLED VASE.

Handled jar.—Dark brown body, thickly worked; broad handle formed of a bundle of cords of clay pressed together and decorated with crisscross scratching. Collar of vessel treated in the same way over a band of imbricated coil. This extremely rude vessel was found in the wall of a pit house and was partially filled with white clay when discovered (fig. 32, No. 292032, U.S.N.M.); 6 inches in diameter, $9\frac{1}{2}$ inches high.



FIG. 34.—CUP WITH BOSSES.

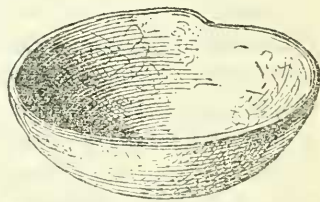


FIG. 35.—BOWL WITH JOGGED RIM.

Handled vase.—Brown paste, smooth body, neck with coil ornament, small handle. The vessel is crudely finished (fig. 33, No. 292041, U.S.N.M.). From a child's burial; $4\frac{3}{4}$ inches in diameter, $4\frac{1}{2}$ inches high.

Cup.—Almost black paste crudely worked; small handle sufficient for the insertion of one finger. On the shoulder is a row of small

bosses formed by punching out the green paste from the inside. This decoration is more often employed in southern than in northern pottery.¹ Among the living Pueblos it is common in Zuni cooking ware,² to which the vessel described has a resemblance. (Fig. 34, No. 292045, U.S.N.M.) From a child burial.

Small bowl.—Dark-brown ware with smooth interior and rather irregular exterior. The vessel is unique in having a jog in the rim



FIG. 36.—BOWL WITH QUATREFOIL DESIGN.

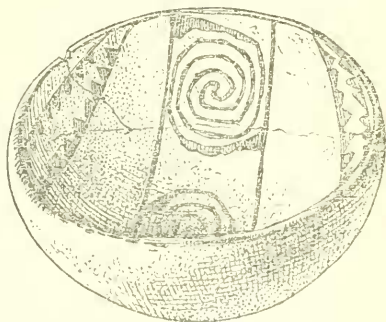


FIG. 37.—WHITE BOWL FROM CHILD'S GRAVE.

intentionally worked. From a child's burial. (Fig. 35, No. 292036, U.S.N.M.)

Bowl.—Brown paste, plain on exterior, washed with white on the interior and decorated in brown. The design is a quatrefoil occupying the center with triangular sections reaching down between the arms. The pattern is heavily gradined (fig. 36, No. 292051, U.S.N.M.) ; $7\frac{1}{4}$ inches in diameter, 4 inches high.

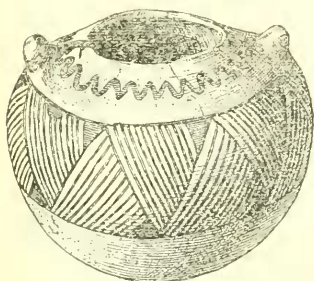


FIG. 38.—INCURVED BOWL WITH LUGS.

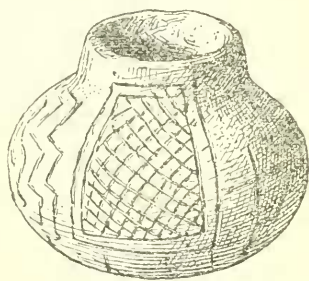


FIG. 39.—SMALL INCISED VASE.

Bowl.—White paste, probably not washed with white. Decoration in black design, embraced in a band passing across the middle of the bowl and two lanceolate sections flanking it on either side. The middle band has three rudely drawn whorls (introducing bird). This arrangement of the field of the bowl is very unusual. (Fig. 37, No. 292044, U.S.N.M.) From the burial of a child; $5\frac{1}{2}$ inches in diameter, $2\frac{1}{2}$ inches high.

¹ Fewkes. Two Summers' Work in Pueblo Ruins, 22d Ann. Rep. Bur. Amer. Eth., pt. 1, p. 189.

² See collections exhibited in the Natural History Building, United States National Museum.

Incurved bowl with lugs.—Homogeneous white paste thinly worked. Two lugs are formed on either side of the mouth of the vase; these are pierced and are like those on ancient globular canteens. The decoration is a zigzag line rudely drawn around the rim and a band of interlocking triangles gradined. Although of good materials, the vessel is rudely executed and the design hesitatingly drawn. Decoration in dark brown. Found in a mealing shed (fig. 38, No. 292049, U.S.N.M.); 8 inches in diameter, 6 inches high.

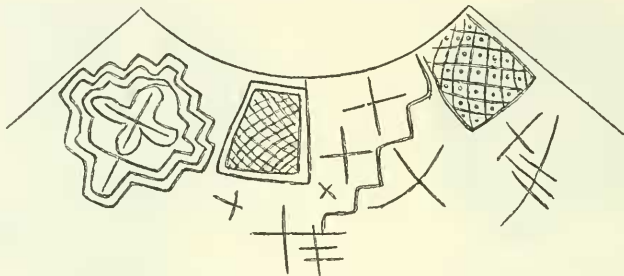


FIG. 40.—DECORATION ON INCISED VASE.

Small incised vase.—Brown to dark brown paste, not well finished; surface and bottom decorated with incised designs scratched in the clay while soft. (Fig. 39, 40, No. 292038, U.S.N.M.) From a child's burial; 3 inches diameter, 2½ inches high.

Bottle-form vase.—Small gray vase with handle. On the neck equidistant from the handle are two projections painted with black rings, probably to indicate eyes, and on the shoulder are three



FIG. 41.—BOTTLE-FORM VASE.

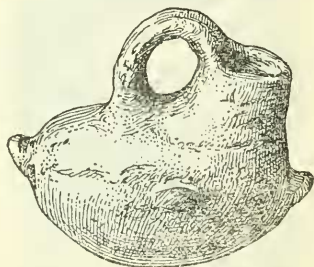


FIG. 42.—BIRD-FORM VASE.

bosses, also painted with a design which forms part of a bird scroll. The body is encircled with a band of interlocking bird convention. The backs of the birds are dentated to indicate plumage, and streaks across the line of the scroll above are of the same meaning. (Fig. 41, No. 292037, U.S.N.M.) The ware is light and the form good, but the decoration is halting; 3 inches in diameter, 3½ inches high.

Bird-form vase.—Brown paste, rough surface; loop handle; tail, wings, and breast represented by projections. Rude as this small ves-

sel is in finish, it shows fundamentally a good conception of form. It was designed as an offering. (Fig. 42, No. 292040, U.S.N.M.) Length, 3 inches; width, $2\frac{3}{4}$ inches; height, $2\frac{3}{4}$ inches.

Bird-form vase.—Gray body worked with white and decorated in black. The decoration consists of horizontal lines around the neck; zigzag lines on the handle; and plumage, wing, and tail conventions forming a band around the body. The wing convention which seems to express the folding of the bird's wing is new, as far as the writer knows. This little vessel, in spite of its obvious crudities in form and execution, shows a considerable advance in symbolic decoration. It is more related to the art of Blue River than to other examples from the locality where it was found. (Fig. 43, No. 292039, U.S.N.M.) From a child's burial; $2\frac{1}{2}$ inches long, 2 inches wide, $2\frac{1}{2}$ inches high.

Spindle whorl.—Disk of decorated pottery having a hole drilled through the center. The vessel from which the disk was made bore

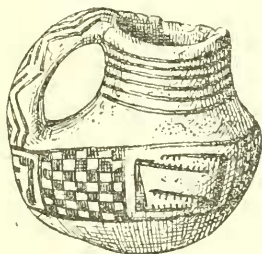


FIG. 43.—BIRD-FORM VASE.

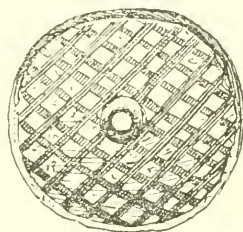


FIG. 44.—SPINDLE WHORL
WORKED FROM POTTERY.

a recticulate decoration (fig. 44, No. 292062, U.S.N.M.); 2 inches in diameter.

Clay roofing.—Made of coarse, red brown clay, showing the impression of a roof timber. In one instance in a mealing shed and in several instances in pits such masses of baked clay were found. Their preservation was due, no doubt, to the destruction of a house by fire. (No. 292076, U.S.N.M.)

Textiles.—There was not a trace of basketry or cloth found in the pit village, but the presence of spindle whorls of pottery would indicate that cord or thread making as a preliminary to weaving was practiced.

SUMMARY.

Our present knowledge of the Pit Dwellers of this section places them on the high mountains at the head of the San Francisco River, in a limited area at 7,000 feet elevation. No one may say that they have not a more extensive range along the mountains, as the traces of their villages are very obscure.

The Pit Dwellers evidently carefully selected for the site of their villages smooth, slightly convex, gently-sloping fans, bordering the alluvial lands, which formerly were lake bottoms. These areas show no surface erosion and the subsoil is a free-draining sandy clay. A familiarity with the topography of one of these sites will enable the archeologist to recognize other sites even where stone villages have been built on the area subsequently. It is desirable to ascertain as far as possible the range of this peculiar culture and whether it extends far out of the bounds in which it is placed by our observations heretofore. At present we know only three pit-village sites here and all would lie in a circle 7 miles in diameter.

Should such remains exist in Johnson Basin, which lies northeast of Luna 18 miles by the easiest crossing of the Datil Range, the problem of distribution to the north of this great barrier would be simplified. Johnson Basin looks out into the Quemado-Zuni-Acoma region, a vast basin country on the Continental Divide and north of the Datils. The mountain masses, which flank the Datils, are very picturesque, are well watered, and would serve as stations in a migration east and west from the White Mountains of Arizona to the Rio Grande. They are, from west to east, the vast black bulk of the Escudilla, the white slides of the Fox, the Demetro range of the western Datils, the mesa-like Escondido of the middle Datils, and the beautiful Allegre range of the eastern Datils. Important ruins are reported in the Fox and Demetro Mountains of the above series. It appears probable for topographical reasons that the route through Blue River, Luna, Johnson Basin, Quemado, Zuni, or Acoma was the ancient migration channel between the north and the south.

Subsistence.—In the high mountain valley of Luna (7,200 feet) after the seasonal rains, there is considerable herbaceous vegetation, some of which may have been utilized by the Indians. Along the streams are wild currants and other mountain berries. The season is not too short for the maturing of hardy corn, such as is now raised by the farmers in the valley. At Alpine, Arizona, maize is raised at 8,000 feet. It is probable that the pit-house people cultivated maize on small irrigated tracts on the perennial streams entering the valley sufficient for their small population. The presence of metates and manos would indicate the use of maize. Acorns, piñon nuts, and cedar berries were at times abundant in the mountains, and agave "mescal" could be secured within convenient distance in the Blue and other canyons on the southern slope.

Animal food was provided principally by the deer, whose bones preponderate in the refuse. The loose bones of mammals, procured during the excavation of the pits, have been identified by Mr. G. S. Miller, jr., of the United States National Museum, who lists deer, buffalo, bear, wolf, and several small mammals; and Maj. R. W. Shu-

feldt, United States Army, has identified the remains of birds and lists turkey, hawk, and ruddy duck.

The presence of buffalo is in line with the finding of the remains of this animal in the Tularosa cave, not far to the east of Luna,¹ and extends the former range of the buffalo westward. The finding of the bones of the White Mountain elk also was anticipated, but not a vestige was discovered, though Luna Valley is in the range of this recently extinct animal.

The presence of the duck is in consonance with the theory that bodies of water may still have remained in the basins—now dry or containing cienagas—at the time when the pit people lived in this region.

A comparison of the artifacts possessed by the Pit Dwellers and by the peoples of normal pueblo type shows in a remarkable way the simplicity of their life. No axes, hoes, or digging stones were found; no large chipped objects; no pipes or cloud blowers; no beads, shells, or turquoise; and no pottery figurines definitely pit dweller—in contrast with the numerous specimens from the stone ruins.

Some points on the age of the Luna Pit Village were derived from a study of the drainage and soil. The top soil is a rich brown to black loam 1 foot thick, which also fills the pits. (See pls. 29 and 30.) The loam is believed to be a forest formation, and it is thought that subsequent to the occupation by man the area was covered with a heavy growth of pines. Excavations under pine stumps show pottery, etc., 3 feet beneath the roots, which observation may be taken for what it is worth. There are 50 dead and about 100 live trees on the area now.

The culture of the Pit Dwellers was, from the evidence secured, quite simple and much less advanced than that of the mountain pueblos of stone construction, whose ruins are abundant in the neighborhood. The culture is inferior to that of any of the sites in the Southwest which the writer has investigated. This fact gives necessarily the aspect of considerable antiquity to the remains, which may or may not be justifiably deduced. Several circumstances suggest a long inhabitation of this region, but present inconclusive evidence. There are quasi indications of the presence of man in the basin along the upper San Francisco River when these basins were lakes.

Another suggestion of age is given by the drainage. On the east side of the pit village at Luna is a perennial stream of small volume which has cut a narrow, deep channel through the lacustrine alluvium. An abandoned course of the stream diverges from the present course at a ledge of hard, white rock (andesite?), which is capped

¹Hough, Bulletin 87, U. S. National Museum, 1914, p. 5.

by a ledge of vesicular basalt. On the white ledge the stream has cut 10 feet below the probable bed of the dry channel. Farther down the stream cuts through the detritus to a depth of 12 feet below the bed of the dry channel opposite the great dance pit. (Pl. 37.) The gulch is about 20 feet deep at the road crossing near the store at Luna. The stream enters the San Francisco River after its course across the bottom land. Large pines grow in both gulches, but larger and more numerous along the present stream. A pine 113 inches in circumference grows on the bank of the dry channel. The old channel is about 80 feet wide and is now being slowly silted up by aerial agencies. (Pl. 38.) It had probably cut in 12 to 15 feet. On its bank was dug the great dance pit. (See plan.) The drainage area of the stream is small and the erosion slight, so that the changes here must have taken considerable time.

The manner of the disposal of the dead among the Pit Dwellers has not been solved. Some years ago the construction of the main irrigating ditch and the consequent removal of great amounts of earth disturbed a burial accompanied with pottery, which is described by informants as being coarse and black. These relics were not preserved. Excavations in the summer of 1916 and 1917 brought out only the remains of infants, which were buried after the Pueblo fashion with mortuary deposits of pottery. Based on the evident length of inhabitation of the pit village, hundreds of burials would have been expected. No explanation of the absence of burials can be offered at present, unless cremation or some custom such as tree or scaffold burial or other open-air exposure was practiced.

There is as yet limited data for correlating with the Luna pit ruins, the rooms discovered by Dr. J. Walter Fewkes during his important explorations of the ruins of Casa Grande, which were encountered beneath the walls of compound B of Casa Grande group, and appear to antedate these constructions.¹ There is some reason to see a similarity between the Pima circular mud-plastered house with accompanying ramada or shed² and the Luna pits with adjoining shed. This type is unquestionably southern.

Concerning the subterranean houses described by Melchior Diaz on his journey northwest from the town of Sonora in search of the sea coast, he says: "They came to a province of exceedingly tall and strong men-like giants. They are naked and live in large straw cabins, built underground like smoke houses, with only the straw roof above ground. They enter these at one end and come out at the other. More than a hundred persons, old and young, sleep in one cabin."³

¹ 28th An. Rep. Bur. Amer. Eth., p. 102, pl. 41.

² See Pima Papago village group, Natural History Building, U. S. National Museum.

³ 14th An. Rep. Bur. Amer. Eth., p. 485.

Were these communal houses of the ancestors of the Yumas?

The curious relationship in a number of respects between the culture of the zone of great pueblos in the north and that of the southern side of the great escarpment (rim) which runs from the Grand Canyon to the Continental Divide is interesting. In pottery we have the incised decoration in coil (fig. 32); partial decorative use of coil on necks and rims of vessels; the serpent figure; long-necked handled vases, and, in wood, the throwing stick, roundel pahos, etc. It is possible that the greatest development of pit structures will be found in the north. There have been discovered the circular "slab houses" of Monument Valley, northeastern Arizona; the circular houses of the "Basket Makers" of Grand Gulch, Utah;¹ and other ruins of northern New Mexico which suggest that this type of habitation is more than sporadic. It is expected also that the artifacts will show characteristics which can be used to demark this culture. In the Little Colorado Valley two ruins have been described as enigmatic at the time of their discovery, but may now be affiliated with the pit-house culture. These ruins are in the neighborhood of the Petrified Forest of Arizona.² One of these, on the slopes of the Mesa Prieta at Woodruff, consists of a large number of shallow basins, and the other on Canyon Butte wash shows circles of slabs and metates set up on the slopes of a small hill. From records in the field notes the pottery and other artifacts conform to those of the pit-house culture. A more detailed examination of these ruins is implied.

¹ Kldder. *Prehistoric Cultures of the San Juan Drainage*, Proc. 19th Intern. Cong. Americanist, Washington, 1917, p. 108-109.

² Hough. *An. Rep. U. S. Nat. Mus.*, 1901, p. 318.